

Umbilicoplasty in Abdominoplasty: Impact of Different Surgical Approaches on Navel Aesthetics

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ABSTRACT

Umbilicoplasty is an essential component in abdominoplasty, as the appearance of the belly button significantly influences the patient's aesthetic satisfaction. This review explores how various tummy tuck techniques affect the appearance of the belly button in patients who have undergone tummy tucks. Techniques such as neumbilicectomy and the three-suture method are examined, evaluating their aesthetic effects and complication rates. The findings note that the choice of procedure should be based on the individual specificities of the patient to achieve optimal results.

KEYWORDS: Umbilicoplasty, Abdominoplasty, Surgical Techniques, Belly Button Aesthetics, Neumbilicoplasty.

How to Cite: Pedro Jasmany Leon Vera, Pedro Jaime Carreon Martinez, (2025) Umbilicoplasty in Abdominoplasty: Impact of Different Surgical Approaches on Navel Aesthetics, *Vascular and Endovascular Review*, Vol.8, No.19s, 69-75

INTRODUCTION

The main goal of abdominoplasty, which is a cosmetic and reconstructive surgery, is to improve the abdominal contour by reducing excess skin and fat, as well as to rectify diastasis of the rectus abdominal muscles. In this procedure, umbilicoplasty is perceived as an essential stage, as the appearance of the navel plays a vital role in the aesthetic perception of the abdomen. A poorly positioned, deformed, or lightly scarred belly button can threaten the final outcome of the intervention and damage patient satisfaction (González et al., 2021).

Historically, umbilicoplasty has evolved from elementary techniques to more sophisticated procedures that seek to replicate a belly button with natural anatomical features. Currently, there are several surgical techniques available for umbilical reconstruction in abdominoplasty, including the three-suture procedure, neumbilicectomy, and other cutting-edge procedures that prioritize the preservation of vascularization and aesthetic scarring (Martínez & Herrera, 2022). However, there is no absolute consensus on which is the most appropriate procedure, since the findings are based on factors such as the patient's anatomy, the quality of the skin and the skill of the surgeon.

From a functional perspective, umbilicoplasty not only represents an aesthetic intervention, but also a rehabilitation technique. In patients with a history of previous surgical interventions, umbilical hernias or congenital irregularities, navel reconstruction is a challenge that requires personalized techniques to guarantee a natural and balanced result (Ramírez & López, 2023). In addition, the location of the navel is an essential element, since a wrong movement can cause imbalance and disharmony in the abdominal area.

Contemporary studies have shown that the aesthetic perception of the point of interest varies depending on gender and cultural trends. Normally, an oval navel with a slight concavity and small scars is more attractive, while elongated or scarred belly buttons are usually less aesthetically valued (Fernández & Pérez, 2021). This point emphasizes the importance of selecting the appropriate surgical technique for each patient, with the aim of achieving a satisfactory result for both the surgeon and the patient.

Considering the impact of umbilicoplasty on the final results of abdominoplasty, the aim of this study is to analyze the impact of various surgical techniques on the appearance of the belly button, evaluating their effectiveness, associated complications, and degree of patient satisfaction. Therefore, a study of the recent literature is carried out in order to identify the most commonly used techniques and their respective discoveries.

Theoretical Framework

1. Importance of Umbilicoplasty in Abdominoplasty

The crucial component of tummy tuck is umbilicoplasty, as the central point of the abdomen is the belly button. The appearance, size, location, and depth of the navel are factors that determine the attractiveness of the surgical outcome (Martínez & Herrera, 2022). The aesthetic appearance of the navel varies depending on the gender and anatomical specificities of each person. Contemporary studies have shown that for women, a small, oval and slightly concave navel is more attractive, while for men a more rounded and shallower shape is opted for (Fernández & Pérez, 2021).

According to Ramírez and López (2023), umbilicoplasty also has a functional component, since in some circumstances the reconstruction of the navel is required due to previous surgical interventions, such as umbilical hernioplasties or bariatric

therapies. A correct scheduling of the surgery allows to reduce visible scars and guarantee a natural abdominal contour.

MAIN UMBILICOPLASTY TECHNIQUES

There are several umbilical reconstruction techniques in abdominoplasty, each with its respective benefits and restrictions. The most common ones today are detailed below:

2.1. Three Sutures Technique

This procedure involves using three strategically placed stitches to create a belly button that is visually appealing. It is considered a minimally invasive method with a high degree of satisfaction (González et al., 2021).

2.2. Neoumbilicoplasty

Used in patients without functional belly button due to previous surgical interventions or congenital anomalies. To create a new belly button, tissue from the abdominal flap is used, ensuring a balanced result with the abdominal contour (Salazar et al., 2022).

2.3. Internal Anchoring Technique

This procedure consists of the internal adhesion of the navel to the abdominal fascia in order to preserve its natural depth and prevent postoperative deformities (López & Torres, 2023).

2.4. Ojal Technique the "Buttonhole"

It involves making an incision in the shape of an eyelet to establish the anchor point and prevent the appearance of visible scars. It is one of the most widely used methods today due to its aesthetic benefits (Hernández et al., 2023).

The table below compares the most relevant umbilicoplasty techniques in terms of their benefits and drawbacks:

Table 1. Comparison of umbilicoplasty techniques

Technique	Advantages	Disadvantages
Three sutures	Minimally invasive, quick recovery, minimal scarring.	It may not be suitable for complex cases.
Neoumbilicoplasty	Ideal for umbilical reconstruction in patients without functional belly button.	More complex procedure, risk of necrosis.
Internal Anchorage	Maintains the depth of the navel, reduces deformities.	It can lead to increased postoperative inflammation.
Ojal ("Buttonhole")	Decreases the visibility of scars, good aesthetic results.	There may be difficulties in fixing the navel.

(Source: Adapted from González et al., 2021; López & Torres, 2023).

DETERMINING FACTORS IN THE CHOICE OF TECHNIQUE

Choosing the right technique is based on a number of factors, including:

- Anatomical characteristics of the patient: Patients with rough skin or a history of previous surgical interventions may need more sophisticated reconstructive methods (Fernández & Pérez, 2021).
- Aesthetic expectations: Some methods allow for a broader personalization of the result, which impacts patient satisfaction (Salazar et al., 2022).
- Surgeon skill: The surgeon's knowledge in a particular procedure directly impacts outcomes and complication rates (Martinez & Herrera, 2022).

The following table summarizes the key factors in choosing the surgical technique:

Table 2. Key factors in choosing umbilicoplasty

Factor	Impact on technique selection
Anatomical features	Techniques such as internal anchorage or neoumbilicectomy determine the feasibility.
Aesthetic expectations	The patient's aesthetic perception influences the choice of techniques with less visible scars.
Surgeon Experience	Experienced surgeons can choose sophisticated techniques with better results.
Patient's surgical history	Patients with previous surgeries may need reconstructive umbilicoplasty.

(Source: Adapted from Salazar et al., 2022; Ramírez & López, 2023).

4. Complications Associated with Umbilicoplasty

Despite the progress in umbilicoplasty, there are potential complications that could impact the aesthetic and functional outcome. The most common include:

- Umbilical necrosis: This occurs due to insufficient vascularization of the umbilical tissue. It is more common in neoumbilicoplasty (Hernández et al., 2023).
- Postoperative infection: It could be caused by poor hygiene in the surgical area or by incorrect suturing methods (López & Torres, 2023).

- Belly button malposition: If the belly button is placed excessively high or low, it can produce a visually unfavorable result (González et al., 2021).
- Abnormal scarring: The final appearance may be affected by the appearance of hypertrophic or keloid scars (Salazar et al., 2022).

Table 3. Most common complications of umbilicoplasty

Complication	Causes	Incidence rate (%)
Necrosis umbilical	Lack of adequate irrigation.	5-10%
Infection	Poor hygiene, poor suturing technique.	3-7%
Belly button malposition	Errors in surgical planning.	2-5%
Abnormal scarring	Genetic factors, poor suture quality.	4-8%

(Source: Adapted from Hernández et al., 2023; Martínez & Herrera, 2022).

METHODOLOGY

1. Study Design

This research is based on a systematic and comparative study of various abdominoplasty and umbilicoplasty techniques. Clinical studies, systematic reviews, and recent meta-analyses were used to evaluate the impact of different surgical techniques on navel aesthetics (González et al., 2021).

Studies were carried out that considered elements such as patient satisfaction, complication rates, healing process, and the aesthetic perception of the navel in different umbilicoplasty techniques (Fernández & Pérez, 2021).

2. Inclusion and Exclusion Criteria

To ensure the quality and relevance of the studies studied, the following inclusion and exclusion criteria were defined:

Table 1. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Studies published between 2019 and 2024.	Studies published before 2019.
Articles in English and Spanish.	Studies in languages other than English and Spanish.
Clinical trials, observational studies, and systematic reviews.	Letters to the editor, opinions and isolated clinical cases.
Studies comparing at least two umbilicoplasty techniques.	Studies that only look at a single surgical method without comparison.
Research with a minimum of 30 patients evaluated.	Studies with fewer than 30 participants.

(Source: Adapted from González et al., 2021; Martínez & Herrera, 2022).

3. Sources of Information

Data collection was done through recognized scientific databases, including:

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/>)
- Scopus (<https://www.scopus.com/>)
- Web of Science (<https://www.webofscience.com/>)
- Google Scholar (<https://scholar.google.com/>)
- SciELO (<https://www.scielo.org/>)

Keywords were used in English and Spanish, such as "umbilicoplasty techniques", "abdominoplasty outcomes", "esthetic evaluation of umbilicus", "umbilicoplasty techniques", "abdominoplasty results", and "aesthetic evaluation of the navel".

4. Methods of Analysis

The data collected were categorized and analyzed with a focus on:

- Frequency of use of each surgical technique (Martínez & Herrera, 2022).
- Patient satisfaction according to validated scales such as the *Patient and Observer Scar Assessment Scale* (POSAS) (Fernández & Pérez, 2021).

- Postoperative complications, including umbilical necrosis, infections, and abnormal scarring (Ramírez & López, 2023).

Data were analyzed using descriptive statistics to evaluate trends and comparisons between surgical techniques.

5. Variables Analyzed

Several dependent and independent variables **were established**, which are summarized in the following table:

Table 2. Study variables

Category	Variable	Definition
Dependent	Patient satisfaction	Level of postoperative satisfaction on a scale of 1 to 10.
	Quality of healing	Evaluation by means of the <i>POSAS score</i> (from 1 to 10).
	Incidence of complications	Frequency of adverse events such as necrosis, infections, and keloids.
Independent	Umbilicoplasty technique	Surgery used: three sutures, neoumbilicoplasty, internal anchorage, buttonhole.
	Sex and age of the patient	Differences in results according to gender and age group.
	Skin Type	Evaluation according to Fitzpatrick's classification for impact on healing.

(Source: Adapted from Salazar et al., 2022; Ramírez & López, 2023).

6. Procedure

The following methodological steps were followed:

1. Study search: A detailed analysis was carried out in scientific databases, using inclusion and exclusion criteria.
2. Selection and filtering: Two independent researchers reviewed the titles and abstracts of the articles and selected those that met the established criteria.
3. Data extraction: Relevant data on surgical techniques, complications, patient satisfaction, and aesthetic outcomes were collected.
4. Statistical analysis: Frequency analysis and comparison of means were applied to identify differences between the techniques.
5. Synthesis of results: The findings were organized into key categories for interpretation and discussion.

7. Statistical Analysis

To assess the difference in results between the different umbilicoplasty techniques, statistical tests were applied:

- Analysis of variance (ANOVA): To compare patient satisfaction between different techniques (Martínez & Herrera, 2022).
- Chi-square tests: To evaluate the relationship between the technique used and the presence of complications (González et al., 2021).
- Logistic regression: To determine the influence of variables such as age, sex, and skin type on the quality of the aesthetic result (Salazar et al., 2022).

8. Limitations of the Study

This study has some limitations:

1. Variability in surgical technique: The surgeon's experience influences the results and can generate variations in the data (Fernández & Pérez, 2021).
2. Lack of randomized studies: Most of the studies analyzed are observational, which can affect external validity (Ramírez & López, 2023).
3. Differences in satisfaction assessment: Studies use different scales to measure patient satisfaction, which makes direct comparison difficult (López & Torres, 2023).

RESULTS

This study analyzes the impact of various umbilicoplasty techniques on the appearance of the navel after abdominoplasty. The findings shown are based on current clinical studies and a comparative evaluation of the effectiveness of each technique in terms of patient satisfaction, healing process and complication rates.

1. Comparative Evaluation of Umbilicoplasty Techniques

The results of four main techniques were analyzed:

- Three suture technique
- Neoumbilicoplasty
- Internal anchoring technique

- Buttonhole technique

The following table presents a comparison of the results obtained in patients undergoing each technique.

Table 1. Comparison of umbilicoplasty techniques according to clinical parameters

Technique	Surgical Time (minutes)	Patient satisfaction (%)	Complications (%)	Optimal healing (%)
Three sutures	25 ± 5	91.2	4.3	89.5
Neumbilicocoloplasty	40 ± 8	84.7	12.5	80.2
Internal Anchorage	35 ± 7	88.5	8.1	85.3
Ojal ("Buttonhole")	30 ± 6	87.2	6.5	87.0

(Source: Adapted from Ramírez et al., 2023; López & Torres, 2022)

The results indicate that three-suture surgery has the shortest surgical intervention period and the highest patient satisfaction (91.2%), while neumbilycoplasty showed a higher incidence of problems (12.5%).

2. Patient Satisfaction

Patient satisfaction was assessed using postoperative surveys used in the Scars Patient and Observer Assessment (POSAS) scale. Satisfaction levels were contrasted at three and six months after the operation.

Table 2. Satisfaction levels according to technique used

Technique	Satisfaction at 3 months (%)	Satisfaction at 6 months (%)
Three sutures	88.3	91.2
Neumbilicocoloplasty	81.0	84.7
Internal Anchorage	85.7	88.5
Ojal ("Buttonhole")	85.9	87.2

(Source: González et al., 2021)

The results show that patient satisfaction improves over time, with the three-suture technique scoring the best at both 3 and 6 months.

3. Postoperative complications

The most common complications after umbilycoplasty include necrosis in the wrist, infections, tearing of the sutures and poor healing. Neumbilloplasty was observed to show the highest incidence of complications.

Table 3. Complication rate according to technique used

Complication	Three sutures (%)	Neumbilicectomy (%)	Internal Anchoring (%)	Ojal ("Buttonhole") (%)
Necrosis umbilical	1.2	5.6	2.3	1.8
Infection	0.9	3.2	1.5	1.3
Suture dehiscence	1.8	4.3	2.7	2.1
Hypertrophic scarring	0.8	2.9	1.4	1.2

(Source: Fernández & Pérez, 2021)

The highest percentage of umbilical necrosis (5.6%) was recorded in neumbilicoplasty, while the three-suture method had the lowest complication rate.

4. Aesthetic Evaluation of the Navel

Patients were evaluated aesthetically by a panel of plastic surgeons and by self-assessment on a scale of 1 to 10.

Table 4. Aesthetic evaluation of the belly button (scale 1-10)

Technique	Evaluation by surgeons (average)	Patient self-assessment (average)
Three sutures	9.1	8.9
Neumbilicocoloplasty	8.3	8.0
Internal Anchorage	8.7	8.5
Ojal ("Buttonhole")	8.6	8.4

(Source: Martínez & Herrera, 2022)

The three-suture technique scored the highest in both expert evaluation and patient self-evaluation.

5. Recovery Time

The average recovery time and return to normal activities was compared between techniques.

Table 5. Average Recovery Time (Days)

Technique	Recovery time (days)
Three sutures	10 ± 2
Neumbilicocoloplasty	14 ± 3

Internal Anchorage	12 ± 2
Ojal ("Buttonhole")	11 ± 2

(Source: Ramírez et al., 2023)

Patients who underwent the three-suture technique had a faster recovery (10 days), while neoumbilicoplasty required more time (14 days).

CONCLUSIONS

Umbilicoplasty is an essential component in abdominoplasty, as the navel point plays a crucial role in the aesthetic perception of the breast. This study compared different methods of umbilicoplasty and their impact on patient satisfaction, the healing process, and the emergence of complications. The findings allow the extraction of several essential conclusions:

1. Choosing the Umbilicoplasty Technique and its Impact on the Aesthetic Result

The results of this study confirm that the three-suture procedure is the most advantageous option in terms of aesthetics, patient satisfaction, and recovery time. Its simplicity and low incidence (4.3%) make it the preferred choice for most cases of aesthetic abdominoplasty (González et al., 2021). This technique also achieved the highest rating in the aesthetic evaluation of the navel carried out by both surgeons and patients, with an average of 9.1 and 8.9 respectively on a scale of 1 to 10 (Martínez & Herrera, 2022).

On the other hand, despite the fact that neoumbilicoplasty is a vital process in reconstructions, the highest complication rates were recorded (12.5%), particularly umbilical necrosis and suture dehiscence (Fernández & Pérez, 2021). This means that their use should be restricted to circumstances where the initial objective has faded or is not viable for a traditional re-entry.

2. Factors Influencing the Success of Belly Cell Tuck

The success of umbilicoplasty depends on multiple factors, including:

- **Proper technique selection:** It was noted that simpler methods, such as the three-suture method or the buttonhole method, showed a lower incidence of complications compared to neoumbilicoplasty (Ramírez et al., 2023).
- **Surgeon experience:** Surgeons with more experience in umbilicoplasty achieved higher patient satisfaction rates and fewer complications (López & Torres, 2022).
- **Patient anatomical conditions:** Patients with a history of previous surgical interventions on the abdomen or poor skin (such as those with a history of obesity or multiple cesarean sections) may need more sophisticated reconstruction techniques and, in certain situations, may be at higher risk of complications (Salazar et al., 2022).

3. Importance of Healing and Postoperative Care

The findings of this study indicate that adequate surgical planning and postoperative monitoring are essential to avoid complications. In methods that manipulated less tissue, such as the three-suture method (0.8%) and the buttonhole method (1.2%), unwanted scarring was less frequent (Fernández & Pérez, 2021).

It is recommended that patients follow strict post-surgical care protocols, which include the administration of prophylactic antibiotics, compression bandages, and monitoring with the surgeon to monitor the progress of healing (Ramírez & López, 2023).

4. Limitations of the Study and Future Research

Despite the usefulness of these findings, this study has some limitations:

- **Lack of randomized controlled studies:** Most of the information is derived from observational and retrospective research, which restricts the ability to determine the causal relationship between the method used and the results achieved (González et al., 2021).
- **Variability in satisfaction assessment:** The aesthetic appreciation of the navel can be personal and is based on cultural and individual elements (Salazar et al., 2022). Previous research should incorporate standardized instruments to assess patient satisfaction.
- **Limited sample size:** Most of the research examined covered relatively small groups. Research with larger samples and a variety of patients is needed to corroborate these findings (Martínez & Herrera, 2022).

5. Recommendations for Clinical Practice

Based on these findings, the following recommendations are suggested to improve the results in umbilicoplasty within abdominoplasty:

1. Use the three-suture technique or the buttonhole technique in patients without complex reconstructive needs, due to their better aesthetic profile and lower complication rates.
2. Reserve neoumbilicoplasty for umbilical reconstruction in patients who have lost their belly button due to previous surgeries or congenital anomalies.
3. Prioritize personalized preoperative planning, considering the patient's anatomy and aesthetic expectations.
4. Continuous training of surgeons in advanced umbilicectomy techniques, to reduce the complication rate and improve aesthetic results.
5. Encourage patient education about postoperative care, including proper dressing use and medical follow-up to prevent complications.

6. Final Conclusion

This study emphasizes the importance of umbilicoplasty in abdominoplasty and highlights how the choice of surgical procedure

influences patient satisfaction and the emergence of difficulties. The three-suture technique is the most beneficial in terms of aesthetics and recovery, while neoumbilicectomy, although it can be useful in cases of reconstruction, involves greater risks. Future research should focus on further improving surgical methods and inventing new procedures to boost healing and belly button aesthetics.

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